WHAT IS CLAIMED IS:

1. A pulse detection device comprising:

a piezoelectric element for transmitting ultrasound into a living body in accordance with a drive signal, or receiving reflected waves of ultrasound reflected by a bloodstream in the living body; and

a base plate having said piezoelectric element mounted on its one surface,

wherein the other surface of said base plate opposite from said one surface is brought into contact with the living body.

2. A pulse detection device comprising:

a transmitting piezoelectric element excited in accordance with a drive signal to generate ultrasound and to transmit the ultrasound into a living body;

a receiving piezoelectric element for receiving reflected waves of the ultrasound transmitted into the living body and reflected by a bloodstream in the living body, and for converting the reflected waves into an electrical signal;

a detection section for detecting a pulse from the ultrasound generated by said transmitting piezoelectric element and the reflected waves received by said receiving piezoelectric element; and

a transmitting/receiving base plate having said transmitting piezoelectric element and said receiving

piezoelectric element provided on its one surface, the other surface of said transmitting/receiving base plate being brought into contact with the living body.

3. A pulse detection device according to claim 2, wherein the acoustic impedance of said transmitting/receiving base plate is an intermediate value between the acoustic impedance of each of said piezoelectric elements and the acoustic impedance of the living body.

4. A pulse detection device according to claim 2, wherein said transmitting/receiving base plate is a glass base plate having a thickness of about 1/4 of the wavelength of the ultrasound generated by said transmitting piezoelectric element.

5. A pulse detection device according to claim 2, wherein said transmitting/receiving base plate has a resin layer formed on the other surface.

6. A pulse detection device according to claim 5, wherein said resin layer is formed of an epoxy-based resin.

7. A pulse detection device according to claim 5, wherein said resin layer is formed of a silicone-based resin.

8. A pulse detection device according to claim 2,

wherein a groove is formed in a portion of said transmitting/receiving base plate, and said transmitting piezoelectric element and said receiving piezoelectric element are placed on said transmitting/receiving base plate on the opposite sides of said groove.

9. A pulse detection device according to claim 2, wherein said transmitting/receiving base plate comprises two base plates, said transmitting piezoelectric element being placed on one of said two transmitting/receiving base plates, and said receiving piezoelectric element being placed on the other of said two transmitting/receiving base plates.

10. A pulse detection device according to claim 2, wherein said other surface of said transmitting/receiving base plate is formed so as to be slanted relative to said one surface of said transmitting/receiving base plate.

11. A pulse detection device according to claim 2, further comprising a supporting base plate for supporting said transmitting piezoelectric element and said receiving piezoelectric element positioned on said transmitting/receiving base plate.

12. A pulse detection device according to claim 11, wherein a sealing material such as a silicone resin is provided between said transmitting/receiving base plate and

said supporting base plate.

13. A pulse detection device according to claim 12, wherein said sealing material is provided so as to surround said piezoelectric elements and so as not to contact said piezoelectric elements.

14. A pulse detection device according to claim 2, wherein a channel is formed in said transmitting/receiving base plate and said piezoelectric elements are placed in said channel.

15. A pulse detection device according to claim 14, wherein the thickness of the portion of said transmitting/receiving base plate remaining after forming said channel is about 1/4 of the wavelength of the ultrasound generated by said transmitting piezoelectric element.

16. A pulse detection device according to claim 11, wherein feeding portions to which an electrical signal is applied are provided on one surface of said transmitting/receiving base plate on which said piezoelectric elements are placed, and feeding portions to be electrically connected to said transmitting/receiving base plate electrodes are provided on the surface of said supporting base plate on which said piezoelectric elements are supported.

17. A pulse detection device according to claim 11, wherein at least one of said transmitting piezoelectric element and said receiving piezoelectric element are joined to said transmitting/receiving base plate by intermetallic bonding.

18. A method of manufacturing a pulse detection device comprising the steps of:

forming wiring metal films on a transmitting/receiving base plate, and an electrode metal film on a transmitting piezoelectric element and on a receiving piezoelectric element; and

placing said transmitting piezoelectric element and said receiving piezoelectric element on said transmitting/receiving base plate such that said metal films are laid on each other, and joining said transmitting piezoelectric element and said receiving piezoelectric element to said transmitting/receiving base plate by using intermetallic bonding between said metal films to fix said transmitting piezoelectric element and said receiving piezoelectric element on said transmitting/receiving base plate and to establish an electrical connection between the transmitting/receiving base plate and each of said transmitting piezoelectric element and said receiving piezoelectric element.

ABSTRACT OF THE DISCLOSURE

There are provided a pulse detection device in which an ultrasound transmitting piezoelectric element and an ultrasound receiving piezoelectric element are precisely placed to limit variation in quality, and a method of manufacturing the pulse detection device. Further, the pulse detection sensitivity is improved in the pulse detection device. In the pulse detection device of the present invention, a transmitting piezoelectric element excited in accordance with a drive signal to generate ultrasound and to transmit the ultrasound into a living body, and a receiving piezoelectric element for receiving reflected waves of the ultrasound transmitted into the living body and reflected by a bloodstream in the living body are placed on a surface of a transmitting/receiving base plate. A processing computation section compares the frequency of the ultrasound generated by the transmitting piezoelectric element and the frequency of the reflected waves received by the receiving piezoelectric element to detect a pulse.